

Ultrasound
TREATMENT

Introduction to Medical Ultrasound Services




Legal Disclaimer

- Information is for general & informational purposes only
- Content is not, nor intended to be, a substitute for professional, legal, or clinical advice
- While we strive to make the information as timely & accurate as possible, we make no claims, promises, or guarantees about the accuracy, completeness, or adequacy of the information contained, & expressly disclaims liability for errors & omissions

Course Objectives

- At the conclusion of this session, participants will be able to verbalize what is medical ultrasound
- Participants will be able to verbalize the historical development of medical ultrasound
- Participants will be able to verbalize the role of ultrasound in Obstetrics and Gynecology
- Participants will be able to verbalize the different types of ultrasound used in Obstetrics and Gynecology



Why is This Topic Important?



- Medical ultrasound is a crucial topic for several reasons in the field of healthcare
- It is important for its non-invasive nature, diagnostic capabilities across various medical fields, role in prenatal care, cardiovascular imaging, procedural guidance, monitoring, portability, & cost-effectiveness. The continuous advancements in ultrasound technology further enhance its significance in modern healthcare

What are Medical Ultrasound Services?

- A safe & non-invasive imaging technology employing high-frequency sound waves to produce real-time images of internal body structures
- Widely used across medical fields, it aids in evaluating physiology, fetal health, & detecting abnormalities in organs & tissues
- Versatile, used for imaging various body parts & guiding procedures like biopsies.
- Recent advancements include 3D imaging & contrast-enhanced ultrasound




Historical Development of Ultrasound



- The use of ultrasound in medicine dates back to the period around & following World War II, with significant contributions from pioneers such as Dr. Karl Theodore Dussik in Austria in 1942
- However, its historical roots can be traced even further back to Lazzaro Spallanzani's work in 1794, which laid the groundwork for medical ultrasound by studying sound waves' ability to locate objects
- Dr. Dussik's research marked an early milestone in using ultrasound for medical purposes, followed by George Döring Ludwig's detection of gallstones in 1949 & Ian Donald's introduction of ultrasound in diagnostic medicine in 1956

- Ian Donald's contributions were particularly noteworthy, earning him the title "the father of OB-GYN ultrasound" for his work in visualizing abdominal tumors, cysts, & fetuses
- The development of commercially available ultrasound systems from the mid-1960s further propelled its widespread adoption as a common medical imaging modality, marking a rich historical development marked by key figures & milestones



The Role of Ultrasound in Obstetric & Gynecology



Obstetrics



- **Pregnancy Confirmation**
 - Ultrasound is often used to confirm the presence of a viable pregnancy & estimate gestational age
- **Fetal Development Monitoring**
 - Allows healthcare providers to monitor growth & development of the fetus
 - Measurements such as crown-rump length (CRL), biparietal diameter (BPD), & femur length help assess fetal age & detect potential abnormalities
- **Assessment of Fetal Anatomy**
 - Detailed anatomical surveys, often performed during the second trimester, help identify any structural abnormalities in the fetus

- **Fetal Well-being and Monitoring**
 - Doppler ultrasound assesses blood flow in the umbilical cord & other vessels, helping to evaluate fetal well-being
- **Multiple Gestations**
 - Ultrasound is crucial in managing multiple pregnancies, monitoring the growth of each fetus, & assessing potential complications
- **Amniotic Fluid Assessment**
 - Helps in evaluating the volume & characteristics of amniotic fluid, which is essential for fetal development
- **Guidance for Invasive Procedures**
 - Ultrasound guidance is often used during procedures such as amniocentesis or chorionic villus sampling to ensure accuracy & minimize risks


Gynecology

- **Pelvic Imaging**
 - Ultrasound is employed to visualize & assess the uterus, ovaries, & surrounding pelvic structures for abnormalities such as fibroids, cysts, or tumors
- **Evaluation of Reproductive Organs**
 - It helps in diagnosing conditions like endometriosis, polycystic ovary syndrome (PCOS), & uterine abnormalities



- **Infertility Investigations**
 - Ultrasound aids in assessing the reproductive organs & identifying factors contributing to infertility
- **Guidance for Procedures**
 - It is used to guide procedures such as hysterosonography, saline infusion sonography, & ovarian cyst aspiration
- **Monitoring Ovarian Follicles**
 - In assisted reproductive technologies (ART), ultrasound is used to monitor the development of ovarian follicles during fertility treatments
- **Uterine Abnormalities**
 - Ultrasound helps in identifying uterine anomalies, such as septate or bicornuate uterus, which may impact fertility or cause complications during pregnancy

Different Types of Ultrasound Used in Obstetrics & Gynecology



- **Obstetric Ultrasound:** Used for confirming pregnancy, estimating gestational age, & monitoring fetal well-being
- **Gynecological Ultrasound:** Pelvic Ultrasound
 - These types of ultrasound play a vital role in the diagnosis & management of conditions in obstetrics & gynecology, contributing to improved maternal & fetal care

Conclusion

- Medical ultrasound is an imaging technology that uses high-frequency sound waves to visualize internal body structures
- Medical ultrasound is a crucial topic for several reasons in the field of healthcare
- It is important for its non-invasive nature, diagnostic capabilities across various medical fields, role in prenatal care, cardiovascular imaging, procedural guidance, monitoring, & its portability & cost-effectiveness. The continuous advancements in ultrasound technology further enhance its significance in modern healthcare
- The use of ultrasound in medicine began during & shortly after the 2nd World War in various centers around the world. The work of Dr.Karl Theodore Dussik in Austria in 1942 on transmission ultrasound investigation of the brain provides the first published work on medical ultrasonics

Conclusion

- Ultrasound plays a crucial role in obstetrics & gynecology, providing valuable information for monitoring the health & development of the fetus during pregnancy, as well as diagnosing & managing various gynecological conditions
- In both obstetrics & gynecology, advancements in ultrasound technology have improved imaging quality & diagnostic capabilities, contributing to better patient care & outcomes
- Regular ultrasound examinations are a standard part of prenatal care & gynecological assessments, providing valuable information for healthcare professionals to make informed decisions regarding patient management

References

- Chieng, R. (2023, July 19). *Ultrasound (introduction): Radiology reference article*. Radiopaedia. <https://radiopaedia.org/articles/ultrasound-introduction?lang=gb>
- U.S. Department of Health and Human Services. (2023, December.). *Ultrasound*. National Institute of Biomedical Imaging and Bioengineering. <https://www.nibib.nih.gov/science-education/science-topics/ultrasound>
- *The history of Ultrasound*. Vista Health. (202, August 11.). <https://www.vista-health.co.uk/blog/history-ultrasound#:~:text=Renowned%20French%20scientists%2C%20Jacques%20and,for%20imaging%20techniques%20in%201928>.
- *Private Ultrasound Scan Clinic London*. International Ultrasound Services. (2024, January 22). <https://www.iuslondon.co.uk/>
